

REMARKS

In view of the preceding amendments and the comments which follow, and pursuant to 37 C.F.R. § 1.111, amendment and reconsideration of the Official Action of September 9, 2004 is respectfully requested by Applicants.

Summary

Claims 3 - 4 stand rejected. Claim 3 has been cancelled, and Claim 4 has been amended. No new matter has been introduced as a result of these amendments.

Claim 4 is pending following entry of the present amendments.

Rejection under 35 U.S.C. § 112

The Examiner has rejected Claims 3 – 4 under 35 U.S.C. 112, second paragraph as being indefinite for failing to point out and distinctly claim the subject matter containing subject matter which Applicants regard as the invention. Specifically, the Examiner points to the phrase “the lower magnetic pole layer” as being indefinite because it lacks antecedent basis in the last paragraph of the claims. Claim 3 has been cancelled. Applicants have amended Claim 4 to further recite that “wherein the lower magnetic pole layer, when formed, and the gap layer are formed by an electrolytic plating process using a pulsed current such that surfaces of the lower magnetic pole layer and gap layer formed by the plating process are substantially flat, and the gap layer composed of NiP does not exhibit magnetism.” This amendment serves to underscore a requirement of the formation of such lower magnetic pole layer in conjunction with the electrolytic plating process used for its formation. Applicants therefore respectfully request that the rejections of Claim 4 under 35 U.S.C. § 112 be withdrawn.

Rejection under 35 U.S.C. § 103

The Examiner has rejected Claims 3 and 4 under 35 U.S.C. 103(a) as being unpatentable over Ju et al. (U.S. 5,285,340) in view of Sirbola (U.S. 4,855,020) and Sun et al. Claim 3 has been cancelled.

Although, Applicants respectfully traverse these rejections, Claim 4 has been amended to clarify the claimed invention and to remove any ambiguity that may have been the basis for the rejections.

Independent Claim 4 is directed to a method for making a thin-film magnetic head. The thin-film magnetic head has a lower core layer, which comprises a magnetic material, and an upper core layer which comprises a magnetic material opposing the lower core provided with a gap layer therebetween.

Independent Claim 4 has been rewritten to further recite "annealing the thin film magnetic head at a temperature in the range of at least 200⁰ C to about 240⁰ C." Applicants submit that pending Claim 4 overcomes the rejection. This amendment finds support in the specification, namely on page 24, lines 15 to page 25, line 12, which states that "the relationship between the P content of the NiP and the saturation magnetic flux density of the NiP when the plated NiP is heated at 200°C, 240°C, and 300°C was determined." Further, in relation to the gap layer composed of NiP and not exhibiting magnetism, this feature is also supported in the specification, namely from page 24, line 26 to page 25, line 6.

Thus, a distinguishable feature is that the NiP, with a desired P content of 12.5% to 14%, which constitutes the gap layer, remains nonmagnetic even after the annealing with a temperature of at least 200⁰ C to about 240⁰ C of the thin-film magnetic head to minimize mechanical deformation. In contrast, Ju discloses a formation of a nonmagnetic gap layer by plating using NiP while remaining silent about a specific P content and a temperature range for hard baking the thin-film magnetic head.

Further, the Examiner states that the Sirbola patent is directed to a method for electrolytic plating of layers of material using NiP which includes a P content of 10% to 15%. In addition, the Examiner indicates that Sirbola teaches that the plating bath may include addition agents, and that the ability to use these agents is cumulative with the benefits of pulse plating, such as fine grain size, leveling and smoothness.

However, Ju and Sirbola references are directed towards methods of fabricating entirely different products. Ju relates to a method for forming a magnetic head, while

Sirbola relates to a method for forming a magnetic disk. Thus, there is no motivation to combine these two methods.

Moreover, Ju and Sirbola cannot be combined. In Sirbola, the pulse initiated metal deposition is performed while the hard disk is rotated (see Figures 3 – 6). Thus, in Sirbola the benefits cited above are achieved by the rotational process of Sirbola's invention (see column 15, lines 7 – 9). However, when fabricating a magnetic head, no rotation is used. Hence, Sirbola is related to a method for plating layers on a hard disk, and thus does not provide a motivation for a combination with Ju for plating layers of thin film magnetic heads.

However, even if Ju and Sirbola were combined, the combination still does not recite the method of Claim 1. Sirbola is silent about the annealing step occurring at a temperature range of at least 200⁰ C to about 240⁰ C. Hence, for at least the above cited differences, Sirbola may not be combined and does not provide a motivation for a combination with Ju to form the claimed thin-film magnetic head.

Further, the Examiner stated that although both Ju and Sirbola references are silent on the electroplating process utilizing a pulsed current, the reference Sun et al. does disclose a method of electroplating with a pulsed current. However, although the Sun et al. reference does disclose an electroplating of the element Nickel onto substrates using a pulsed current, it does not disclose or suggest the electroplating of Nickel alloys containing a plurality of elements and a desired distribution of these elements in an electroplated layer. Nor is there any motivation in Sun that the process can be altered to electroplate Nickel alloys. Thus, Sun et al. fails to disclose or suggest the electroplating of a NiP layer with a desired P content in the range of 12.5 mass percent to 14 mass percent.

Hence, the Ju, Sirbola, and Sun references, either taken alone or in combination with each other, fail to suggest a motivation for a combination to form the claimed thin-film magnetic head. As such, Claim 4 is patentable over Ju et al. in view of Sirbola, and in further view of Sun et al. Applicants therefore respectfully request that the rejection of Claim 4 under 35 USC 103(a) be withdrawn.

Conclusion

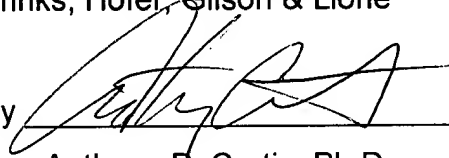
Applicants submit that this application is now in condition for allowance, and favorable reconsideration of this application in view of the above amendments and remarks is respectfully requested. Allowance of Claim 4 at an early date is earnestly solicited. If, there are additional fees due, Applicants request that this paper constitutes any necessary petition and authorizes the Commissioner to charge any underpayment, or credit any overpayment, to Deposit Account No. 23-1925.

If the examiner finds that there are any outstanding issues which may be resolved by a telephone interview, the Examiner is invited to contact the undersigned at the below listed number

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